Removal of a Complex Odontoma Associated With an Impacted Third Molar

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LEARNING OBJECTIVES:

After reading this article, the individual will learn:

- diagnosis and treatment of odontomas, and
- potential pitfalls associated with the surgical procedure for removal of an odontoma.

ABOUT THE AUTHOR

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INTRODUCTION

Odontomas are benign tumors of odontogenic origin consisting of enamel, dentin, cementum, and pulpal tissue. These tumors are characterized by slow growth and constitute 22% of all odontogenic tumors. Two types of odontomas are recognized: compound and complex. Compound odontomas appear as numerous miniature or rudimentary teeth. Complex odontomas appear as amorphous conglomerates of hard tissue. The compound type is approximately twice as common as the complex type. Some are associated with spontaneous eruption of teeth.

Odontomas are known as mixed odontogenic tumors because they comprise tissues of both epithelial and mesenchymal origin. These tissues differentiate fully, resulting in deposition of enamel by ameloblasts and dentin by odontoblasts. This tumor presents more commonly in children and adolescents, and more commonly in the maxilla than the mandible. The compound type tends to occur in the anterior part of the jaws, and the complex type tends to present in the posterior part. Histopathologically, normal-appearing enamel, dentin, cementum, and pulp may be seen.

Odontomas are considered to be a type of odontogenic tumor that may cause the impaction of both primary and permanent teeth. Most are found when a patient is evaluated radiographically for tooth eruption disturbances. The most frequently affected jaw is the maxilla. Treatment consists of surgical removal of the odontoma when feasible. Although most maxillary odontomas are small and easily diagnosed and removed by the practitioner, removal of a larger odontoma may be challenging. Adherence to certain surgical principles is essential to prevent pitfalls and allow for atraumatic and successful removal of large maxillary odontomas.

This article presents a case involving a large, complex odontoma that had displaced an impacted maxillary third molar to the orbit, and describes the surgical technique and principles for achieving a successful treatment outcome.

CASE REPORT

A 22-year-old female presented with a painless enlargement of the left posterior maxilla that had gradually enlarged over one year. Orthopantomography (OPG) showed a dense radiopaque mass occupying the posterior portion of the left maxilla and an impacted maxillary third molar displaced to the orbit (Figure 1). The patient was in good general health, and clinical and laboratory examinations were normal. Surgical removal was performed.

Figure 1. Preoperative view of 2-year-old PFM crown on the right first mandibular molar.
Surgical Technique

A full-thickness trapezoid mucoperiosteal flap was reflected buccally from the line angle of the first molar, extending posteriorly to the second molar, and then over the tuberosity and upward (Figure 2). A thin layer of bone overlying the odontoma was removed using an electric drill. Using a round bur at 10,000 to 30,000 rpm with normal saline irrigation, bone removal was initiated in the form of an oval window several millimeters behind the distal root of the second molar and above the crest of the tuberosity, exposing the calcified mass (Figure 3). The mass was sectioned with an electric drill and removed in pieces using a straight elevator (Figure 4). The dental follicle was removed using a curette. The flap was replaced and secured with 3-0 polyglactin sutures.

Surgical Considerations

For accessing large, superiorly impacted complex odontomas of the posterior maxilla such as the one presented here, the clinician should adhere to the following principles:

1. General anesthesia or IV sedation is usually required because extensive retraction of the lip and cheek is often needed for access.
2. The mouth should not be maximally opened with a bite block, as this will restrict access to the posterior maxilla. As the mouth opens, the coronoid process of the mandible moves forward to lie adjacent to the maxillary tuberosity.
3. A large, triangular mucoperiosteal flap with posterior extension or a trapezoid flap must be employed, degloving the maxillary tuberosity to provide maximal access.
4. For mucoperiosteal flaps in this area, care should be taken not to perforate the periosteum, otherwise the buccal fat pad may extrude into the operating field, hampering visualization and complicating the surgery.
5. An electric drill should be used, not an air-driven drill, because the latter predisposes to emphysema.
6. An attempt should be made to preserve the crest of the tuberosity and remove the bone from above by creating a “buccal window” cut out of the maxillary bone several millimeters smaller than the diameter of the odontoma. The odontoma can be removed through this window. One to 2 mm of bone should also be left distal to the remaining molar to ensure bone formation and prevent subsequent pocket formation.7,8
7. Large odontomas should not be removed in one piece, as this necessitates excess bone removal and may predispose to a fracture if undercuts are present in the

7. Large odontomas should not be removed in one piece, as this ne-cessitates excess bone removal and may predispose to a fracture if undercuts are present in the
space occupied by a complex odontoma. These odontomas are conglomerates; they section easily and can be removed atraumatically in pieces.

8. Care should be taken not to push the tooth or tooth segments into the maxillary antrum.

9. Often, there is a lining of soft tissue resembling a follicle that should be removed with a curette after removing the odontoma and impacted tooth.7-10

Adherence to these principles facilitates the surgery and prevents untoward complications.7-9 Recurrence is rare, although it has been reported after incomplete removal of an odontoma.6

DISCUSSION

Odontoma is the most common odontogenic tumor.1,2 Most occur in the first and second decades of life, and the mean age at the time of diagnosis is 14 years.1,2 Odontoma is frequently associated with an impacted tooth and occasionally with a dentigerous cyst,11 and it has a marked predilection for the maxilla and for the anterior region of the jaw. Although complex odontomas are found in the posterior jaw, Chang11 found them most commonly in the anterior maxilla.

Odontomas act similarly to impacted teeth, thus they often cause disturbances in the eruption of teeth (eg, impaction or delayed eruption of the dentition, retention of primary teeth, and abnormalities in the position of the teeth, tipping or displacement of adjacent teeth). Although the majority of unerupted teeth are in the permanent dentition, the problem can be identified in the early-mixed dentition.1,2 Complex odontomas are usually located in the first and second molar areas of the mandible. Although the compound type is equally distributed between the genders, 60% of complex odontomas occur in women.4 Compound odontomas seldom cause bony expansion, while complex odontomas often cause slight to marked bony expansion.4

Surgical exposure and removal of the odontoma, and elimination of the mechanical obstruction is frequently the treatment of choice, and spontaneous eruption can then be expected.11 The surgical specimen should be carefully examined microscopically to rule out ameloblastic odontoma or myxofibrous hyperplasia.11 Odontomas usually present a typical radiographic appearance because of their calcification. However, differential diagnosis may include focal sclerosing osteomyelitis, osteoma, periapical cemental dysplasia, ossifying fibroma, and cementoblastoma.1 When an odontoma is present, histological examination reveals enamel matrix, dentin, cementum, pulp tissue, fibrous capsule, ghost cells, reduced enamel epithelium, and nests of odontogenic epithelium.2

CONCLUSION

Odontomas are benign tumors of odontogenic origin, and there are 2 types: compound and complex. These tumors may cause the impaction of both primary and permanent teeth. This article presents a case involving the surgical removal of a complex odontoma fused to the third molar tooth, and discusses surgical principles that can help achieve a successful treatment outcome. In this case, surgical removal of the mass was accomplished under general anesthesia, and the tumor was submitted to a pathologist. The pathology was reported to be a complex odontoma fused to the third molar. The postoperative course was uneventful. Postoperative recall OPG revealed bone formation in the surgical site one year postoperatively (Figure 5).

Figure 5. Panoramic radiograph one year postoperatively. The lesion has filled with bone.
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REFERENCES


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**POST EXAMINATION QUESTIONS**

1. **A compound odontoma _____.**
   a. is radiolucent
   b. is amorphous
   c. presents with pain
   d. appears as numerous miniature or rudimentary teeth

2. **Complex odontomas _____.**
   a. are amorphous conglomerates of hard tissues
   b. are similar to a tooth
   c. are radiolucent
   d. expand and perforate bone

3. **Compound odontomas _____.**
   a. have a tendency to occur in the anterior part of the jaws
   b. have a tendency to occur in the posterior part of the jaws
   c. occur more often in the mandible
   d. occur more often in females

4. **Complex odontomas _____.**
   a. have a tendency to occur in the anterior part of the jaws
   b. have a tendency to occur in the posterior part of the jaws
   c. occur less often in the mandible
   d. occur more often in females

5. **What is the main advantage of an electric drill?**
   a. It prevents emphysema.
   b. It has higher rpm than an air-driven drill.
   c. It provides better bone removal than an air-driven drill
   d. It generates less heat than an air-driven drill.

6. **How may an odontoma affect the primary dentition?**
   a. perforation of the bone
   b. infection
   c. impaction of teeth
   d. causes pain

7. **Differential diagnosis of an odontoma may include _____.**
   a. focal sclerosing osteomyelitis
   b. central giant cell granuloma
   c. periapical granuloma
   d. fibrous dysplasia

8. **Odontomas have _____.**
   a. epithelial origin
   b. mesenchymal origin
   c. epithelial and mesenchymal origin
   d. pulp origin
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